

# Potential Positive and Negative Environmental Impacts of Increased Use of Woody Biomass for Energy Production

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## Fact Sheet

### The Issue

As California strives to achieve its renewable energy and greenhouse gas goals, there is increased interest in using biomass from California's forests and shrublands for electricity generation. While a number of studies have estimated the amount of biomass that could be sustainably harvested, there is little ecosystem-specific data on the potential environmental impacts of increasing harvest rates from current levels.

### Project Description

This project:

- Surveyed the importance stakeholders attach to a range of environmental, economic, and social sustainability concerns that would be involved in an increased use of forest biomass for energy production.
- Conducted a comprehensive review of the published literature from the United States and elsewhere on the environmental impacts of the use of woody biomass for energy and identified remaining information gaps.
- Assessed the potential benefits of applying to California best management practices, regulations and third party certification processes used elsewhere to improve management of woody biomass for electricity production.



Woody biomass that could be used for energy production.

Photo Credit: Washington State Department of Natural Resources

### PIER Program Objectives and Anticipated Benefits for California

As the state's energy demand continues to increase, seeking alternative sources of renewable energy is vital. A better understanding of the impacts associated with woody biomass energy production will help ensure that California residents continue to have stable, secure, and reliable sources of energy that are obtained in an environmentally responsible manner.

### Research Results

In the survey of forest landowners, regulators and environmental groups in California, all groups expressed strong interest across a wide range of issues related to increased production of renewable energy from biomass. Compared to other groups, forest landowners were more interested in

economic and social sustainability, regulators were more interested in criteria air pollutant and greenhouse gas emissions, and environmental groups were more interested in site level sustainability.

The literature review showed that the major environmental concerns addressed are: 1) long term forest productivity, 2) erosion and sedimentation, 3) and maintaining important wildlife habitat and biodiversity, but that much of this literature addressed areas that have very different soils, tree species, and wildfire regimes than California.

In regard to forest productivity, long-term experiments in California's mixed conifer forests show no loss of long term productivity from biomass harvesting, but there are few results from other forest types, woodlands or shrublands. This is especially true for low productivity sites, especially under repeated harvesting regimes.

The potential impacts of additional biomass harvesting on soil productivity, soil erosion, and stream water quality appear to be similar to those associated with the more intensive forest harvesting regimes and can be successfully addressed through use of best management practices. Again, there is a need for research on low productivity sites.

The effects of additional woody biomass harvests on biodiversity are highly variable with the reported results being strongly influenced by the wildlife species of interest and the spatial and temporal scale being evaluated.

The potential loss of some of the size classes of live trees, snags, and downed wood from wildfires,

other disturbances, or biomass harvests could have negative effects on wildlife habitats and biodiversity. However, the current predictive tools have limited effectiveness in measuring impacts of different approaches.

Much of the published guidelines to limit the negative environmental impacts of biomass feedstock are also based on experiences in areas with very different soils, tree species, and wildfire regimes than California. For example, these guidelines typically recommend higher residual biomass retention fractions of the original biomass that are not necessarily appropriate for California's fire adapted forest ecosystems where biomass accumulation and production has naturally been reduced by periodic wildfire.

## Project Specifics

Contract Number: 500-99-013

Contractor: California Institute for Energy and Environment, University of California

City/County: Berkeley/Alameda

Application: Regional

Amount: \$99,409

Term: January 2009 to September 2010

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